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PART 17 - AIRCRAFT INSTRUMENT AIRWORTHINESS*

17.00 GENERAL. An aircraft instrument** required by the Civil Air Regulations to be type certificated and installed in certificated aircraft is eligible for a type certificate upon meeting the requirements hereinafter prescribed.

17.01 SCOPE. The airworthiness requirements set forth in this Part shall be used as a basis for determining the original eligibility of aircraft instruments for use in certificated aircraft or for the issuance of type certificates therefor.

17.02 DEVIATION. Deviation from these requirements may be permitted if it is clearly demonstrated that such deviation meets standards equivalent to, or in excess of, the requirements of this Part to insure safe operation.

17.03 ACCEPTANCE OF ARMY OR NAVY REQUIREMENTS. Equivalent requirements of the United States Army or Navy, with respect to airworthiness, may be accepted in lieu of the requirements provided in this Part.

17.04 CLASSIFICATIONS OF INSTRUMENTS. For the purpose of this Part, aircraft instruments are defined and classified as follows:

17.040 FLIGHT INSTRUMENTS. Flight instruments are defined as devices used in an aircraft to indicate its velocity, acceleration, altitude, attitude, or change of direction.

17.041 NAVIGATION INSTRUMENTS. Navigation instruments are defined as devices used in an aircraft to indicate its proper direction of flight and to determine the geographical position of the aircraft in which they are installed.

17.042 POWERPLANT INSTRUMENTS. Powerplant instruments are defined as devices used in an aircraft to indicate the operation and functioning of the powerplant.

17.05 RATINGS OF INSTRUMENTS. An instrument may be certificated by meeting the specified requirements for either a Precision rating, or a Standard rating.

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*Civil Aeronautics Manual Part 17 issued by the Civil Aeronautics Administration will contain the Administrator's explanations and interpretations of the requirements of the Part.

**The term "instrument" shall be construed to include component units.

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17.1 DESIGN, CONSTRUCTION AND TESTS - GENERAL

17.10 GENERAL. Instruments shall be designed and constructed to function reliably under all flight and atmospheric conditions and when properly installed, operated, and maintained in an aircraft, to withstand the jars, vibration, and other conditions incident to normal usage without loss of required accuracy.

17.100 MATERIALS. Instruments shall be constructed of materials of the best commercial quality and suitable for the purpose intended. Non-magnetic materials shall be used for all parts of the instrument except where magnetic materials are essential. Metals shall be of the corrosion-resisting type unless suitably protected to resist corrosion during its normal service life.

17.101 WORKMANSHIP. Workmanship shall be in accordance with high-grade aircraft instrument manufacturing practice.

17.102 ACCURACY. Instruments shall meet standards of accuracy and reliability consistent with safety in the type of flight operations for which they are intended and within the test limits specified hereinafter.

17.103 INSTRUMENT READABILITY.

17.1030 LEGIBILITY. The means of indication shall be so designed and constructed as to reduce to a minimum the possibility of error in interpreting the indication or in making a manual setting of the indicating system, and when the instrument is properly installed in an aircraft to enable interpretation of the indications to be made readily with the required degree of accuracy.

17.1031 ILLUMINATION. The illumination for dial indications and indicating pointers shall be in accordance with the requirements of the instruments for the type of flight operations as defined in Section 04.5.

17.104 IDENTIFICATION DATA. Each type certificated instrument shall be plainly and suitably marked in a permanent manner with at least the following information:

17.1040 ON THE DIAL -

(a) Instrument nomenclature including rating classification and operation wording. (conspicuous form).
(b) Type Certificate Number. (inconspicuous form).
(c) Such additional information as is specifically requested hereinafter.

17.1041 ON THE CASE -

(a) Name and address of manufacturer.
(b) Manufacturer's model designation.
(c) Manufacturer's part number.
(d) Manufacturer's serial number or date of manufacture.
(e) Such additional information as the manufacturer may deem pertinent.
(f) Such additional information as is specifically requested hereinafter.

17.11 TESTS

17.110 FACILITIES. The applicant shall furnish suitable test equipment, adequate facilities, and competent personnel to conduct the required tests.

17.111 WITNESSING. A representative of the Administrator, upon authorization, shall witness the prototype tests and the tear-down inspections hereinafter prescribed.

17.112 TEST REPORTS. The applicant shall prepare and submit a complete report describing the testing of the instrument and the tear-down inspections. Such report shall be signed by the person responsible for conducting the tests and also by the authorized representative of the Administrator who witnessed the testing and the tear-down inspections.

17.113 PROTOTYPE TESTS. The prototype instrument shall be laboratory tested under conditions simulating operation in flight and shall demonstrate satisfactory performance of its intended functions. The testing requirements hereinafter specified shall be followed so far as they are applicable. The testing methods and apparatus shall be acceptable to the Administrator.

17.1130 CALIBRATION TESTS. Instruments shall be subjected to suitable calibration tests to determine the magnitude of error throughout the range of indication. The effects of reasonable variations in pilot compartment atmospheric conditions and of any operating characteristics which might appreciably affect the accuracy of the instrument operating under conditions simulating both the normal, and the most severe conditions reasonably expected in service in accordance with the requirements hereinafter prescribed, shall be determined.

17.1131 VIBRATION TESTS. Instruments shall be subjected to vibration tests on a suitable test stand under conditions simulating the most severe conditions reasonably expected in service.

17.1132 ENDURANCE TESTS. Instruments shall be suitably endurance tested under conditions simulating the most severe conditions reasonably expected in service. Such tests shall include the determination of any operating limitations or installations or maintenance procedures necessary to insure reliability in service.

17.114 TEAR-DOWN INSPECTION

A. At the completion of the prototype tests, the instrument shall be completely disassembled and a detailed inspection made of the instrument parts. Highly stressed parts shall be examined by suitable methods to determine the presence of fatigue effects. Measurements shall be taken before and after the tests so that the amount of wear can be determined. A conformity check consisting of a comparison of the parts of the instrument tested with the drawings shall be made at the discretion of the Administrator.

B. If any component part of the instrument shows evidence of excessive wear, fatigue, or impending failure or is otherwise not in a condition for safe operation, the instrument shall be considered unsatisfactory unless appropriate and satisfactory corrective measures are taken.

17.2 TYPE CERTIFICATE

17.20 TYPE CERTIFICATE PROCEDURE. A request for Type Certificate shall be supported by the following:

(a) An application for Type Certificate and Production Certificate ***, if the latter is desired.
(b) A set of drawings descriptive of the instrument.
(c) A list in duplicate of all drawings applicable to the instrument if a number of drawings is required to describe it. If only two or three drawings will suffice, the list is not necessary, in which case the drawings shall be submitted in duplicate.
(d) Such test reports and other data as are herein prescribed.

17.21 INSPECTION. An authorized representative of the Administrator shall be permitted at any time or place to make such inspections and tests as are neeessary to determine compliance with the requirements of this Part.

*** For regulations governing issuance of Type and Production Certificates - see Part 02.

17.22 TESTING OF PRODUCTION UNITS. Instruments manufactured under the provisions of a Type Certificate shall be subjected to such tests as are necessary to determine that the required standard of accuracy is maintained in individual instruments.

17.23 INSTRUCTION MANUAL. The holder of a Type Certificate shall prepare and submit for approval by the Administrator suitable instructions for the installation, operation, servicing, and maintenance of the type certificated instrument before a Production Certificate shall be issued. In addition, he shall make the approved instructions available to authorized persons engaged in the operation and maintenance of instruments manufactured under such certificate and shall prepare, submit for approval, and make available such revisions to the instructions as are deemed advisable from service experience.

17.24 CHANGES IN DESIGN OR CONSTRUCTION. Alterations or modifications made by an instrument manufacturer to a certificated instrument shall be divided into either one of the two following classifications, and in all doubtful cases, the decision of the Administrator shall establish the class within which a specific change will be included.

17.240 MAJOR ALTERATIONS. A major alteration is defined as being any change in the design, construction, or operating limitations which might have an effect on the reliability or other airworthiness characteristics of an approved instrument. Adequate proof to show that the airworthiness of the instrument has not been adversely affected shall be submitted to the Administrator, together with adequate technical data describing the alteration(s), and the tests conducted to determine the effect of the alteration(s) on the instrument's airworthiness. Instruments incorporating alterations in this class shall not be released for service until such alterations are approved by the Administrator.

17.241 MINOR ALTERATIONS. A minor alteration is defined as being any change that does not come within the scope of the definition of a major alteration. Adequate technical data describing each minor alteration shall be submitted to the Administrator and shall be brought up to-date at least every six months of a calendar year. In addition, such technical data descriptive of all current minor alterations shall be made available (in the manufacturing plant) to an authorized representative of the Administrator.